the successive periods as applicable to England, and concludes that the Chellean is not pre-Glacial, but is referable to the middle of the Pleistocene age. He discusses the human skeleton embedded in ochre found by Buckland in the Paviland cave, Glamorganshire, and points out that it is paralleled by similar burials of a late Palæolithic period in France and Moravia. He considers that the importance of the Engis skull has been exaggerated, and concludes that the Tilbury man cannot be later than the beginning of the Neolithic period. He gives reasons for supposing that the early Neolithic immigrants to western Europe may have lived for some time with the Palæolithic peoples whom they found there.

The description of the Terramara settlements, which occupies nearly 200 pages, forms an exhaustive work of reference on a subject on which Dr. Munro speaks with special authority. More than 100 of these large flat mounds in the valley of the Po have now been examined, and it seems clear that they are all referable to the Bronze age. They are generally quadrangular in shape, and their average superficial area is about seven acres. Implements, seeds and fruits, and bones of the animals used for food are so numerous that a very fair idea of the life of the inhabitants can be obtained, and it is evident that they were occupied with many industries. They made their own bronze implements and ornaments, worked also in bone and terracotta, and must have woven much cloth, judging by the extraordinary variety and abundance of spindle-whorls and loom-weights. Their pottery is especially artistic, and the peculiar horned appendages fixed to the tops of the handles have not been found outside the area of the Terramare and certain districts influenced by the civilisation of their inhabitants.

MATHEMATICAL TEXT-BOOKS.

(1) *Matematica Dilettevole e Curiosa.* By Ing. Italo Ghersi. Pp. viii + 730. (Milano: Ulrico Hoepli, 1913.) Price 9.50 lire.

(2) *New Analytic Geometry.* By Prof. P. F. Smith and Prof. A. S. Gale. Pp. x + 342. (Boston and London: Ginn and Co., n.d.) Price 6*s.* 6*d.*

(3) *Experimental Mensuration: An Elementary Text-Book of Inductive Geometry.* By H. Stanley Redgrove. Pp. xvii + 328. (London: W. Heinemann, 1912.) Price 2*s.* 6*d.* net.

(4) *Geometrical Optics.* By A. S. Percival. Pp. vii + 132. (London: Longmans, Green and Co., 1913.) Price 4*s.* 6*d.* net.

(5) *Problèmes d'Analyse Mathématique.* By Prof. E. Fabry. Pp. 460. (Paris: A. Hermann et Fils, 1913.) Price 12 francs.

(6) *Lecons sur l'Intégration des Equations Différentielles aux Dérivées Partielles.* By Prof. M. V. Volterra. Pp. ii + 83. (Paris: A. Hermann et Fils, 1912.) Price 6 francs.

(1) THIS collection of mathematical paradoxes should be of interest to a large circle of readers. It is remarkably comprehensive, occupying more than seven hundred closely printed pages, is profusely illustrated, and is published at a very reasonable price. Those who are acquainted with Mr. Rouse Ball's work will find much in these pages with which they are already familiar, but there will be very few who will not discover something that is new and surprising. In addition to the standard problems of antiquity—the squaring of the circle, the trisection of an angle, and the duplication of the cube—there are elaborate sections on arithmetic, algebra, geometry, and mechanics. There are problems on shunting, map-making, perpetual motion, trammells, constructions with limited instruments, probability, magic squares, boomerangs, draughts, chess, and many other themes of a popular character. It is, however, impossible to give any detailed account of so miscellaneous a work; enough has, perhaps, been said to show that there is abundant material to while away any number of idle hours.

(2) It is gradually becoming recognised that the practice in elementary text-books of restricting cartesian geometry to straight lines and curves of the second degree gives the student a narrow idea of the power and generality of analytic methods. For ordinary purposes a course of the character set out in the volume before us is, in our view, far more valuable than that given in most English text-books. Intricate properties of conics and systems of conics, homogeneous coordinates, invariants, &c., are omitted, and space is thus obtained for curves of higher degree and the elements of three-dimensional geometry. There is an excellent collection of examples, few of which demand from the student any high degree of analytic skill.

(3) The author gives us, in the present work, a distinctly original text-book on geometry. He is in sympathy with the principles laid down in the circular issued by the Board of Education, and, in addition, contends that this subject loses most of its educational value if it is not united from the first with mensuration and trigonometry. The trigonometrical ratios are accordingly introduced in the second chapter, and applications are made at every convenient opportunity. With the exception of a few of the chief geometrical theorems, which are mainly derived by inductive processes, there is no formal geometry, and practically all

©1913 Nature Publishing Group

the examples are of a numerical type. In our opinion, a text-book such as this is more useful to the teacher than the student; we are inclined to think that it is too diffuse for the latter, but it contains so much that is suggestive and stimulating that few teachers would not gain from using it to supplement and guide their class-work. A good feature of the book is the inclusion of descriptions of calipers, verniers, diagonal and plain scales, the micrometer screw-gauge, the spherometer, the planimeter and opisometer, methods of measurement of volumes, the construction and use of a scale of chords, and Simpson's method for evaluating areas. There is also an appendix on the use of duodecimals.

(4) The author writes primarily for medical students, but there is no reason why his work should not be equally suitable for any student of elementary physics; very small demands are made on the mathematical capacity of the reader. The fundamental results are established at such length, and so clearly, that they should be intelligible to all. Great importance is attached to the use and meaning of algebraic signs; as soon as this idea is grasped, the formulæ employed assume simple forms. The text-book is purposely practical rather than academic; there is, for example, little mention of the general mathematical theory of systems of lenses or properties of the paths of rays in heterogeneous media. But the author supplies an abundance of excellent illustrations and exercises which will give the student a far better grasp of the principles of the subject than he would gain from an abstract mathematical treatise.

(5) This collection of about 270 problems (many of which contain several parts), selected from recent French examination papers, is divided into twelve sections: integration, multiple integrals, analytic functions and curvilinear integrals, differential equations, plane curves, skew curves and surfaces, asymptotic lines and lines of curvature, ruled surfaces, partial differential equations, geometrical applications of partial differential equations, total differentials, elliptic functions. The statement of the problems occupies one-seventh of the book; the rest is devoted to their solution. Where we have tested them we have found them sufficiently clear and detailed for any student of average ability. We have no hesitation in saying that this collection will be of real value to students and teachers alike; and its utility will be still further increased if the publishers are able to issue the problems in a separate volume.

(6) These lectures, which were published a few years ago, are now re-issued with a few notes and corrections. Pressure of other work has prevented the author from attempting to re-write them in the light of the very considerable progress that has been made in the last six years, but the addition of numerous bibliographical references will enable the reader, if inclined, to see what has been done. In a comparatively small compass the author covers a wide range of theory. In dealing with the bearing of the theory of differential equations upon physical problems, he investigates the elliptic, hyperbolic, and parabolic types with a view to the interpretation and application of the many-valued form of solution and the relation to multiply-connected domains.

OUR BOOKSHELF.

Myths of the Modocs. By Jeremiah Curtin. Pp. xii + 389. (London: Sampson Low, Marston and Co., Ltd., n.d.) Price 12*s.* 6*d.* net.

"THE value of Indian myths lies in the fact that they represent the mental labour of men who lived ages before those who recorded their thoughts on papyrus, baked brick, or burnt cylinder" (p. 383). The author has supplied us with a valuable set of documents embodying the floating traditions of the Modocs, whose country lies on the borders of Oregon and California. "Man does not appear in any of these myths" (p. 383). In their non-human and non-moral elements the myths belong to the same stratum as the oldest Irish and Welsh tales, which are generally admitted to be pre-Celtic. In his too brief notes on the myths the author is evidently impressed with their obvious astronomical significance. The first he records "is evidently a sun myth." Mr. Curtin obtained the bulk of his information from "the oldest woman of the Klamath-Modoc tribe of Indians," and from one who, in the prime of his life, was chief of his people.

It is certain that if the witnesses were cross-examined on their astronomical knowledge, the astronomical significance of the myths would have appeared much clearer than it is found in the book. A golden opportunity has been missed. In one case the astronomical key was simply thrown into the author's hand. The myth of the "Star Brothers" ends as follows:

"'You and your brother will no longer be persons; you will be stars, and between summer and winter your people will fight over you.'

"The younger boy was at the edge of the sky when the old man's spirit said: 'You will be a star.' Right away he was one. As soon as the elder boy reached the edge of the sky he became a star too.

"NOTE.—These two stars appear early in the morning toward the end of winter. They are the heralds of spring" (p. 117).

It is practically certain that the author's informant could have pointed out the "Star Brothers." What we have given us is the very basis of the astronomical interpretation of myths and monuments.

JOHN GRIFFITH.

©1913 Nature Publishing Group